Fact Sheet #6 - October 2002

US ARMY CORPS
OF ENGINEERS
New England District

# Long Island Sound
# Dredged Material Disposal Site Designation EIS
## Field Program for Alternative Disposal Sites

## Background

The U.S. Environmental Protection Agency (EPA) and the U.S. Army Corps of Engineers (the Corps) are preparing an Environmental Impact Statement (EIS) that will consider the potential designation of one or more dredged material disposal site(s) in Long Island Sound (LIS), Connecticut and New York. This EIS will be specific to the western and central regions of LIS, although previous data collection included the entire Sound. The eastern regions of LIS will be evaluated at a later date. This proposed action is being conducted consistent with Section 102 (c) of the Marine Protection, Research, and Sanctuaries Act (MPRSA) and 40 CFR 230.80 of the regulations of the EPA under Section 404 of the Clean Water Act (CWA). The EIS will be prepared in accordance with the National Environmental Policy Act (NEPA), and the Council on Environmental Quality (CEQ) Regulations (40 CFR 1500 et seq.).

There are four dredged material disposal sites currently in use in Long Island Sound: Western Long Island Sound Disposal Site (WLIS), Central Long Island Sound Disposal Site (CLIS), Cornfield Shoals Disposal Site (CSDS), and New London Disposal Site (NLDS). In March 2002, the Corps and EPA made a determination to narrow the Zone of Siting Feasibility (ZSF), or the area in which existing dredged material disposal sites may be located, to initially consider the potential designation of one or more sites in the western and central regions of Long Island Sound, while deferring review of the eastern region to a later date. This narrowed ZSF includes the WLIS and CLIS sites.

This Fact Sheet is one of a series designed to inform and update the public on the dredged material disposal and site designation process. Other public involvement is encouraged in the form of workshops, meetings, and group discussions. In this particular Fact Sheet, the efforts to evaluate alternative disposal sites in LIS are discussed. During the alternative site screening process, the Corps, EPA, and federal and state agencies proposed two historic dredged material disposal sites (Bridgeport and Milford) for evaluation in the EIS as potential alternatives to CLIS and WLIS, in addition to no action alternatives for each disposal site (the locations of these two sites are shown in Figure 1). In order to evaluate the conditions consistent with previous studies conducted at the

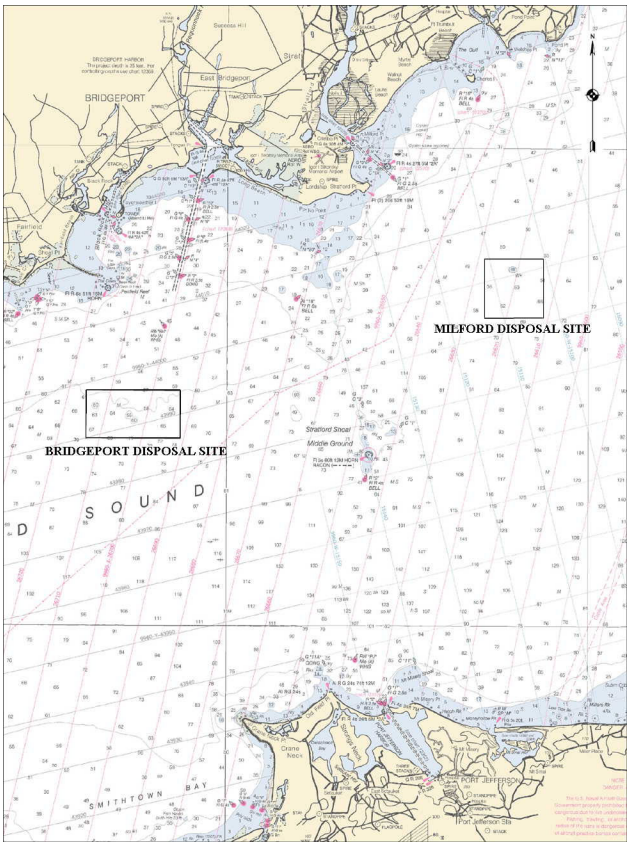


*Figure 1. The locations of the Bridgeport and Milford historic disposal sites in relation to the Connecticut and New York state borders.*

existing sites, the Corps and EPA developed a sampling and analysis program to obtain further information on these historic disposal sites. This plan includes sediment sampling, sediment profile imaging (SPI), archaeological/geomorphological surveys, and lobster resource surveys to obtain information on benthic habitat, sediment characteristics, the presence of significant historic and archaeological resources, and site geomorphology. The surveys were conducted by Battelle and Ocean Surveys, Inc.

## Sediment Sampling Surveys

Three replicate sediment samples were taken from each of three target stations (nine total) at the sites. In addition, one sample with three replicates was taken from a predetermined reference station at each site. These samples will be analyzed to understand the community structure of animals that live in the sediment (benthic infauna), ascertain the distribution of certain contaminants, and determine the toxicity of the sediment.

## Survey/Sampling Methodologies

### Benthic Infauna Sampling

Sediment samples for benthic community analysis were collected using a 0.04-$m^2$ Ted Young grab sampler that was deployed into the water from the research vessel (see Figure 2). The physical features (i.e., depth of penetration, sediment color, texture, and odor, and surface features and macro-fauna) of the sediment were initially described. The sediment samples, and the resident infauna, were then sieved through a 0.5-mm sieve. The contents of the sieve were preserved before being shipped to an analytical laboratory for species identification. The benthic infauna themselves will be identified to the lowest possible taxonomic category; and benthic community parameters such as species density by sample, the dominant infaunal species, evenness of distribution, and community assemblage patterns will be developed. The benthic community parameters will allow direct comparison to data from the existing dredged material disposal sites in Long Island Sound collected previously as part of this EIS.

### Chemistry Sampling

Sediment samples for chemistry analysis were collected in triplicate at four stations at each site (three samples in the site and one sample at the reference site for a grand total of 30 samples) using a 0.1-$m^2$ Ted Young grab sampler. The samples were preserved in glass bottles and carefully stored for shipment to the analytical laboratory for analysis. Laboratory analysis will include such contaminants as polycyclic aromatic hydrocarbons (PAHs), pesticides, metals, polychlorinated biphenyls (PCBs), and dioxins. In addition, physical characteristics of the sample (i.e., grain size, water content/percent solids, specific gravity, and total organic carbon) will also be recorded.

Additional samples were collected for the analysis of zinc, chromium, and lead to provide additional data for these metals. The chemical and physical parameters are the same as those measured at CLIS and WLIS and will allow for comparison to be made among the sites. The particular analytes collected were chosen due to their bioavailability or because they are known carcinogens.

### Toxicity Sampling

Simultaneously with the sediment sampled for chemical analysis, samples were collected for toxicity testing. Using a 0.1-$m^2$ Ted Young grab sampler, three replicate samples were taken within the Bridgeport and Milford sites. In addition, three replicates were collected at one reference station for each of the sites. This resulted in a total of 12 samples at each site, or 24 total samples.

The toxicity testing will include the use of a 10-day solid phase acute exposure amphipod bioassay using the amphipod *Ampelisca abdita*, an organism selected pursuant to guidance documents. This amphipod is a representative species for marine benthic organisms found in Long Island Sound. *A. abdita* will be exposed for 10 days to the sediment samples collected from the sites, and the mean percent survival will be recorded. This will determine whether or not the contaminants in these samples pose a toxic threat to benthic organisms and provide a basis for comparison to the other sites.

*Figure 2. Researchers collecting sediments for physical, chemical, and biological testing using the 0.04-$m^2$ Ted Young grab sampler.*

## Sediment Profile Imaging (SPI)

SPI is a survey method to evaluate the environmental status of the bottom habitat using a remote camera. SPI has been conducted for the past 30 years for monitoring of the existing disposal sites. The SPI system takes high-resolution photographs of the top 25 cm of the seabed, making it very useful for describing the benthic habitat conditions at the alternative sites, as well as providing data for monitoring the changes and recovery of these sites, should they be used at later dates.

At each of the alternative sites, 29 stations were visited, each with three replicates. In addition, three replicate photograph samples were taken at each of three stations in the two reference sites. This resulted in a total of 96 photographs. The reference sites were similar in depth to the alternative sites.

## Survey Equipment

The sediment profile camera system consisted of a 35-mm camera enclosed in a pressure-resistant housing, a 45° prism, and a mirror that reflects an image of the sediment through the camera lens (see Figure 3). A strobe light was also included in order to illuminate the sediment at depth. The SPI system penetrated the sediment-water interface and photographed the upper 25 cm of seafloor. After each photograph, the SPI camera was raised from the sediment and redeployed back into the sediment. Each redeployment was considered a "sample."

The photographic images will be used to evaluate the benthic community structure and to assess the existing habitat. Specifically, the photographs will be analyzed for sediment grain size, camera prism penetration depth, small-scale surface boundary roughness, sediment aeration, infaunal successional stage, and Organism-Sediment Index (OSI), which reflects the overall benthic habitat quality. SPI surveys have already been performed at WLIS and CLIS. The data from this survey will allow a direct comparison of the bottom habitat conditions at all the sites.

*Figure 3. A sediment profile camera system.*

## Archaeological/ Geomorphological Surveys

An archaeological/geomorphological survey of the proposed alternative disposal sites was conducted to determine the presence of any significant underwater historic or archaeological resources. Survey transects were oriented north to south at 50-m intervals.

A cesium marine magnetometer was deployed in order to measure any magnetic field strength along the site transects. The magnetometer was towed approximately 25 feet above the seafloor, which will allow detection of large iron or steel objects. Readings from the magnetometer will be evaluated by the marine archaeologist and geophysicist.

Side scan sonar was also used to help determine the possible locations of historic or archaeological resources that might have gone undetected by the magnetometer. The sonar was towed within 25 to 30 feet above the seafloor in order to provide high-resolution sonar images. On the vessel, the marine archaeologist and geophysicist monitored and reviewed the recorded images to identify locations of historic or archaeological significance.

Finally, sub-bottom profiling was utilized in order to better characterize the upper layers of sediment. Using a 3.5-kHz pinger system, readings from the seafloor profile will provide data on the thickness of sediment layers (see Figure 4 for an example of a sub-bottom profiling image). The marine archaeologist will evaluate these readings to determine if historic or archaeological resources are buried in the sediment and at what depth they are buried. In addition, the data will be analyzed to produce maps of seabed morphology and sub-bottom stratigraphy.

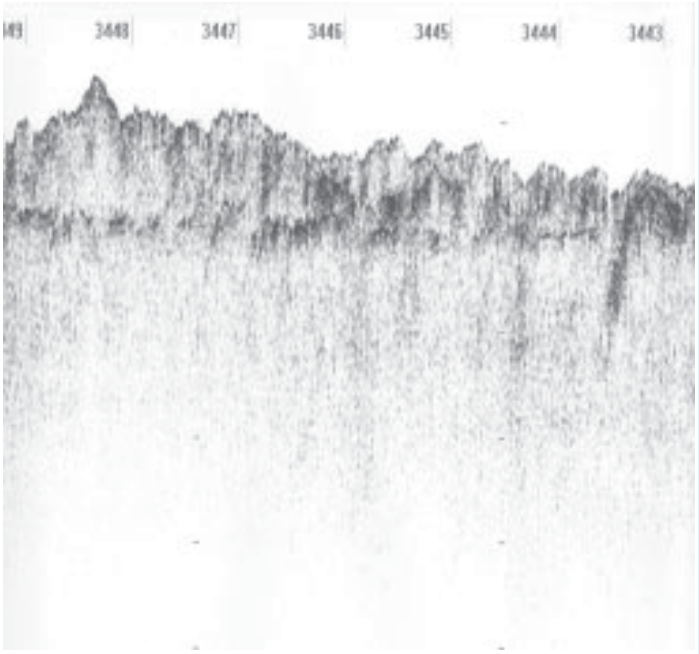


*Figure 4. An example of a sub-bottom profiling image from the Milford site. The vertical scale is exaggerated.*

## Lobster Resource Surveys

The lobster resources and lobster fishery activity were characterized at the two alternative sites, as well as CLIS and WLIS. The lobster populations and fishing patterns were identified through discussions with lobster fishers at meetings located in the Milford, Bridgeport, and Stamford areas of Connecticut. The information collected in these meetings will be evaluated and appropriate data mapped using a Geographic Information System (GIS).

## Results

- The analyses of the sediment samples are ongoing.
- The analytical results, once assessed and reported, will be available at the next public working group meeting and on the EPA Web site (address is below).

**For more information, please contact Ann Rodney, US EPA, 1 Congress Street, Suite 1100, CWQ, Boston, MA 02114-2023, 617-918-1538 (tel), 617-918-1505 (fax), rodney.ann@epa.gov (email), or visit our Web site at www.epa.gov/region01/eco/lisdreg/.**